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Résumé

La présence de poids harappéens et mésopotamiens trouvés hors de leur région d'origine est discutée ici dans un contexte théorique d'économies de pré-marché ; il est mis en évidence la coexistence de liens commerciaux, d'échanges de dons et d'expéditions lancées par une élite bien organisée pour se procurer certains biens. Le facteur politique était si envahissant que l'on peut penser que l'action de peser représentait plus qu'un moyen d'évaluer le prix du bien acquis. Des systèmes encore récemment en usage en Inde montrent bien les raisons qui font que les poids trouvés ailleurs qu'en leur lieu d'origine sont peu nombreux et de petite taille. En outre, la présence de poids étrangers dans quelques grandes maisons de Mohenjo-daro nous semble significative.

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THEORIZING BRONZE-AGE INTERCULTURAL TRADE : THE EVIDENCE OF THE WEIGHTS

S. RATNAGAR

Abstract : *The evidence of the Harappan and Mesopotamian weights found overseas is discussed in the context of a theory of pre-Market economies, acknowledging the co-existence of commerce, gift exchange and elite-organized procurement expeditions. The political factor was pervasive, and weighing was not solely a means of measuring commodity price. Systems recently in use in India are relevant to the fact that the weights abroad were small and few. Also, the occurrence of foreign weights in a few large Mohenjo-daro houses is significant*.*

Résumé : *La présence de poids harappéens et mésopotamiens trouvés hors de leur région d'origine est discutée ici dans un contexte théorique d'économies de pré-marché ; il est mis en évidence la coexistence de liens commerciaux, d'échanges de dons et d'expéditions lancées par une élite bien organisée pour se procurer certains biens. Le facteur politique était si envahissant que l'on peut penser que l'action de peser représentait plus qu'un moyen d'évaluer le prix du bien acquis. Des systèmes encore récemment en usage en Inde montrent bien les raisons qui font que les poids trouvés ailleurs qu'en leur lieu d'origine sont peu nombreux et de petite taille. En outre, la présence de poids étrangers dans quelques grandes maisons de Mohenjo-daro nous semble significative.*

Key-Words : *Weights, Market system, Bronze-Age intercultural trade, Formation processes of the archaeological record.*

Mots Clefs : *Poids, Système de marché, Échanges, Âge du Bronze, Processus de formation des enregistrements archéologiques.*

Archaeologists working on the trade between Mesopotamia, the Gulf, southern Iran, and South Asia have noted the occurrence of Mesopotamian and Harappan weights abroad. Obviously, some items of exchange had to be accurately quantified, but does this indicate Market-system trade as we know it ? A range of views appears in the literature, but in the absence of an established social science theory of the structure of bronze-age economies it is difficult to sift out the plausible from the absurd. Cultural difference is often emphasized in defence of anti-theory positions and we know, for instance, that Bronze-Age Egypt was different from contemporary Sumer in dozens of ways. Yet Baines and Yoffee show that Egypt and Sumer do, in tandem, give evidence for the form of

bronze-age societies. Social structure is not an externality we can observe, yet it is by reference to evolution (which does not mean the absence of historical discontinuities) and the “stages” of development that we can construct a typology in order to make cross-cultural comparisons that are valid.

The theoretical framework suggested in this paper is that the richly-documented Mesopotamian¹ and South Asian² civilizations emerged from tribal (or kin-ordered) societies, acquiring institutions of social control beyond the scope of a kinship system. While many institutions of kin-organized structures remained in place (most remarkably the communal ownership of agricultural land in the countryside), in the first cities there

* This is a condensed version of a paper read at the College de France in January 2002.

1. I follow DIAKONOFF, 1991 ; GELB, 1965 ; LIVERANI, 1984 ; RINGER, 1984 ; VAN DE MIEROOP, 1993, 1997 ; VAN DRIEL, 1998 on this.

2. RATNAGAR, 1991.

were temple and elite-centred craft workshops signifying a division of labour beyond simple householding. Tools and weapons were not only of stone but also of copper and bronze, and rulers needed to organize supplies of metal. Exotic stone, shell, and metals were acquired from afar for elite sumptuary consumption. There is scant evidence for wages or harvest taxes : instead, people laboured for their kings/gods. Differential access to temple land and its produce, and to the labour of others, meant that social relationships were not reducible to the rights and obligations of kinship. Ruling elites organized the integration, the hierarchies, and the division of labour that made urbanization possible³. All this was to gradually change after 2,000 BC and this framework does not constitute a theory of trade. Yet it has no place for the Market-system, the commodification of land and labour, or the pricing of various factors and products according to demand and supply.

The use of weights goes back to early times in Mesopotamia. Polished pebbles of varying shapes at JN-period Fara could be the earliest⁴. The earliest securely identified weight, however, dates to ED III : weighing 680.485 g, it is inscribed as a *mana*⁵ of wool rations⁶. Soon haematite, the “truth stone”, was regularly used for weights⁷, not only for its attractive hue and gloss, but presumably also for its hardness (up to 6.5 on Mohs’ scale) which made chipping (tampering) difficult. A huge haematite duck inscribed with the name of – *i.e.*, with the official sanction of – Ur Ningirsu of Lagash (2,121–2,118 BC) in the British Museum weighs two talents or 60.5 kg. Standardized weights of Shulgi also took the form of the duck with its head tucked back. Later weights were spindle or barrel shaped. Meanwhile, in South Asia, weights of the Mature Harappan period were made of siliceous stones like chalcedony and chert : again, the choice would have been largely dictated by technical reasons.

We find that weighing was an adjunct to both craft production and exchange. True, at Shortughai, presumably a colony engaged in the collection of minerals, there are no weights ; in the bead workers’ graves 12 and 77 at Shahr-i Sokhta there are stones and tools⁸ but no weights ; and in

areas identified as lapidary work places at Mohenjo-daro⁹ weights are rare unless they were themselves being cut and polished there.

Yet in DK-G Block 6A¹⁰, a copper weighing-scale pan occurred together with unfinished beads and a couple of tools. There is also a Mohenjo-daro house (XIII.2.VS-A) with 3 courtyards and 28 rooms, a bath, and a well, which has yielded the cores of several shells, seals, and two weights. A half-cube weighing 3.48 g was found on the surface at Nageswar¹¹, a shell cutting Harappan site. At Chanhu-daro, the floors and immediate vicinity of a bead-maker’s house yielded a bronze scale-pan and more than 22 weights, 14 of them in a single room. Weights were made at Chanhu-daro – unfinished pieces also occur there, together with finished and unblemished weights that could have been the test-pieces¹² – in the same place as beads of agate and carnelian. At Banawali there is a closed find buried beneath a house floor : the base of a round pot filled with two finished beads, a cubical weight, some unworked stones and terracottas, and a possible unfinished cubical weight¹³. Here too, bead and weight production seem to be connected. And in OB Larsa, cached material under a temple floor includes 67 weights together with the materials and tools of smiths and lapidaries¹⁴.

Bronze weighing-scale pans are probably under-represented at ancient sites because they are likely to have been melted down once their utility was over. They have been reported at al Hiba, Susa, and Tell Asmar in third-millennium contexts ; a pair occurred in the *Vase à la Cachette* treasure of Susa period IV ; a pair at Ur was in a sarcophagus burial together with five small weights of different shapes¹⁵. They occurred with stone weights in the Saar burial 352, Bahrain, and at Mohenjo-daro and Surkotada (where pans were also of terracotta). (Scale pans made of very tightly and carefully woven basketry in southern Karnataka are on display at the Janapada Loka Museum at Ramnagara).

The first text references to systematic weighing occur in the Fara archives¹⁶ (*ca* 2,500 BC). Akkad period texts quantify things “by the correct stone weight”¹⁷. In Hammurapi’s laws,

3. See EYRE, 1987 ; BAINES and YOFFEE, 1998 ; and HARING, 1998 for ancient Egypt, where too public institutions held huge estates and there is little evidence for private landed property and the labour (rather than harvest tax) of the peasantry was paid for in daily necessities. But in Egypt land plot allotments for state service tended to become hereditary.

4. MARTIN, 1988.

5. In Sumerian *manu* means “to count”.

6. POWELL, 1990.

7. Some were made of diorite.

8. PIPERNO, 1976.

9. VIDALE, 1987.

10. MACKAY, 1938.

11. HEGDE *et al.*, 1992.

12. MACKAY, 1943.

13. *Indian Archaeology 1987-1988 – A Review*, 27, pl. VI.A.

14. ARNAUD *et al.*, 1979.

15. TALLON, 1987.

16. POWELL, 1999.

17. *Chicago Assyrian Dictionary*, henceforth *CAD*, sub *abnu*.

penalties for crimes must be “weighed out” in silver. In state workshops precious metals were repeatedly weighed to verify output and to account for all metal that was handed to smiths.

In the trade records of Sumerian towns engaged in the Gulf and South Asia trade, garments, carnelian beads, and carnelian oblongs were quantified by number ; barley and oil by capacity measure ; but wool, the metals, ivory, lapis and coral by weight. In the Mari archives are references to the weights of the palace and those of merchants¹⁸. In the Kültepe letters, a merchant may be advised to weigh out his tin personally or with his own weight stones¹⁹. And in the OB period an official inspecting a cargo boat on the Euphrates found a load of tin and a leather bag with weighing stones²⁰. In Mesopotamia, Oman and Bahrain, and at Susa it is not just Harappan-type weights that occur, but also Harappan pottery, seals, carnelian beads, etc. Clearly, then, merchants travelled with weights, the Mesopotamians carrying them in leather bags. The travelling merchant was “one who bears the bag” of weight stones (and, later, metal)²¹. Leemans finds that in Cappadocia the term *naruqqum* signified the capital for a trade venture and also the bag of weights.

Weights of one culture occur at the sites of another, and various systems were utilized : the Harappan with a unit of about 13.65 g with divisions and multiples of 8 and 100 ; the Dilmunite (1 *mana* = 1,350 g, multiples/divisions of 8 and 100) evidenced by the weights of Qala’at al Bahrain and the cuneiform text about the Ur and Dilmun *manas* analysed by Roaf²² ; and the Mesopotamian sexagesimal system with a *mana* of about 500 g. That merchants could adapt to more than one system is indicated in the Kültepe tablets and by UET V 796 which refers to copper quantified by the Ur and the Dilmun standards.

Here I do not go into metrology. Ascalone and Peyronel find in their metrological study not just 31 Mesopotamian weights at Harappan sites but also 21 Egyptian and 43 Syrian ones – hard to accept when we have slender evidence for direct Indus connexions with Egypt or Syria. It is a reasonable inference that barrel-shaped weights at Harappan sites were of Mesopotamian origin : for instance, there is a marked correlation at Mohenjo-daro between the use of an exotic black stone and the elongated barrel shape, this contrasting with the vast

majority of local cubical/flattened sphere weights of siliceous stones. So too, all Harappan weights abroad, except for five from Qala’at al Bahrain, are of chert.

The problem with metrology is that calculations of the standard depend on the sample. Some scholars take the Mesopotamian shekel to be 8.41 g²³, others²⁴ as 8.35 to 8.60 g. Roaf cautions that precision is not possible and that weights from OB Ur give us a *mana* of value 491 to 512 g, i.e., only approximately 500 g. The weights were made by hand, and we do not know the range of error that was permitted. Hemmy gave the Harappan unit a range of 12.6 to 14.6 g, although the mode was 13.64 g, and found²⁵ that only the cubical weights of Chanhudaro appear to have been accurate. Moreover, Rao says²⁶ that of about 30 excavated Lothal weights only 21 cubical ones conform to a perceptible standard. So the actual weight of a certain spindle-shaped artifact at a Harappan site is not the criterion for doubting that it was a Mesopotamian weight. As for Mesopotamian weights, Powell²⁷ estimates a deviation of 3 % from the standard. And when Frifelt²⁸ identifies 16 stones at Umm an Nar (Oman peninsula) as “probable” or “possible” weights largely because 4 of them conform to the Ebla standard, we remain unconvinced : too many shapes and stones are involved, and of four pyramidal stones just three are of haematite with only one of them matching the shekel of Ebla.

An administrative enquiry into the accuracy of the weights used in the 1920s and 1930s in several towns, *mandis*, villages, and factories in British-ruled Punjab²⁹ is instructive about deviations from the standard in an actual situation. 13,512 weights were studied : factory-made and stamped, or unstamped, weights, and *kaccha* weights of brick, rocks and wood. It was found that only 51 % of them were accurate – 41% were below the norm, and almost 8 % heavier than necessary³⁰. The larger weights were up to 5 % too light, and up to 1.6 % too heavy.

Let us consider the weights that occur at a distance from their homeland. The evidence is tabulated as follows.

23. ARCHI, 1987a.

24. ASCALONE and PEYRONEL, 1999.

25. See MACKAY, 1943.

26. RAO, 1985.

27. POWELL, 1979.

28. FRIFELT, 1995.

29. MYLES, 1936.

30. Weights tend to suffer wear and tear. Unstamped iron weights showed the greatest degree of inaccuracy, with only 5.4 % correct, 68 % under-weight. Surprisingly, of the *kaccha* weights 17 % were accurate : about 40 % were below norm and about 39 % too heavy.

18. JOANNES, 1989.

19. CAD sub *saqatu* : VLEENHOEF, 1972.

20. LEEMANS, 1960.

21. LEEMANS, 1950.

22. ROAF, 1982.

Table 1 : Harappan weights abroad.

Site	Reference	Value (g)	Remarks
Mehi (Kulli culture, Baluchistan)	PIGGOTT, 1950 : 113	(2.3 × 2.3 × 1.6 cm)	Cubical chert.
Tell Abraq (Oman peninsula : Umm al Qaiwan)	POTTS, 2000 : 130	14.2, 53.95	2 cubical chert ; a third one damaged ; all from the tower. Ivory combs and black-slipped jar sherds at site.
Shimal (Oman peninsula : Ras al Khaimah), site Sh 6	VOGT, 1996 : 118	27	Cubical, slightly damaged ; banded chert. With pottery of Harappan affinity.
Shimal (Oman peninsula : Ras al Khaimah) site Sh 99	CLEUZIOU and VOGT, 1985 : 272 ; VOGT, 1996 : 118	25.71 when its two pieces were glued together	Collective grave. Weight is highly polished, spheroid, of banded chert.
Saar settlement (Bahrain) house # 223	CRAWFORD, KILLICK and MOON, 1997 : 33, pl. 91	6.8	Cubical chert. Debris of a ruined house.
Qala'at al Bahrain Ib	HØJLUND and ANDERSON, 1994 : 395	1.8	Steatite cube of the Dilmun standard based on the Indus system.
Qala'at al Bahrain IIa	<i>Ibid.</i> ; ROAF, 1982	13.5, 13.9, 171, 670, 1370	2 cubical (steatite, chert) and 4 flattened spheres (misc. fine stones) ; fit Dilmun metrology of texts. Near city gate that led to shore.
Susa	BELAIEW, 1934 ; AMIET, 1986 : 143-144	27 (1.9 × 2.3 × 2.4 cm)	Chipped cube, yellow veined jasper. Associated with other Harappan artefacts. Belaiew mentions several weights, some of them heavy, of Harappan standard.
Ur	RATNAGAR, 1981 : 184-185	13.5	Chert. Ur III period disturbed stratum.

Note frequency of weights of +/- 13 and 27 gm.

Harappan weights are scattered across the trading world of that time.

Mesopotamian weights occur in Bahrain and South Asia, but not in Oman.

Certain observations follow.

(A) At Mohenjo-daro two Mesopotamian weights occurred in house VI.15.DK-G that also had a rare fuschite cup, cached copper/bronze items, and two cubical Harappan weights. Strangely, the foreign weights were buried under a courtyard in a bronze vessel together with a few bronze implements.

A 33.55 g Mesopotamian weight lay in house XII.2.VS-A, with niched walls, mother-of-pearl, ivory, and faience squirrels.

Marshall reported a small barrel weight, HR 1115, in VII.3.HR-A, but from the location given in the Field Register³¹ it appears that this item comes from II.2.HR-A, also an affluent residence with alabaster, ivory and faience artifacts and two local weights, HR 636 and 796.

In VIII.7.DK-G occurred a barrel-shaped weight and 4 cubical ones, the barrel-shaped being the heaviest of them. Significantly, two tall and narrow-based jars of a sort that also occur in Oman were also in that house.

And the huge house or "palace", I.1.DK-G, had an unblemished barrel weight of black stone (96.47 g) as well as 15 local weights scattered in many rooms.

31. MARSHALL 1925, 1931 ; JANSEN and URBAN, 1985.

Table 2 : *Mesopotamian weights abroad.*

Site	Reference	Value (g)	Remarks
Susa	BELAIEW, 1934 ; PEYRONEL, 2000	1470 to 4.25	146 weights, mostly haematite ; elongated barrel (spindle) + duck-shaped.
Qala'at al Bahrain IIb	HØJLUND and ANDERSON, 1994 : 396	1.4	Spindle-shaped. 4 Dilmun seals in the same room (near the city gate).
Al Hajjar settlement (Bahrain)	<i>Ibid.</i> : 396 ; <i>BCTS</i> : 225	8.32, and its double and fractions 1/4, 2/3	4 spindle-shaped weights.
Saar settlement (Bahrain)	CRAWFORD, KILLICK and MOON, 1997 : pl. 91 ; KILLICK, p.c.	Intact piece : 9.1 g	2 spindle/barrel-shaped haematite weights.
Saar burial # 352	HØJLUND and ANDERSON, 1994 : 396-397		8 haematite barrel-shaped, with a pair of weighing scales.
Saar tumulus 4	<i>BCTS</i> : ill. 100-3, 104-5	3.02, 8.08, 16.40, 81.87 ; 24.5, 5.12	4 haematite barrel-shaped, 2 duck-shaped.
Al Hajjar burial (Bahrain)	<i>BCTS</i> : 225	5.61, 8.5, 16.57	3 barrel-shaped. Haematite.
Harappa	VATS, 1940 : 361-2	7.65, 25.5, 37.5, 61.3, 80.65, 128.15, 130.2	10 complete. "Hornblende". Barrel-shaped.
Mohenjo-daro	MACKAY, 1938 : 400 ff, 619 ff.	Perfectly preserved ones : 96.47, 55.9, 151.424, 28.47, 33.55	About 10 barrel-shaped, 5 of which of a black stone. 2 on display in National Museum.
Dholavira	BISHT, p.c.	Not weighed as yet.	Barrel-shaped. A local limestone ?
Lothal	RAO, 1985 : 560	54.0, 203.6	Barrel-shaped. No findspot recorded.

In sum, at Mohenjo-daro the loci were not public squares or streets but large houses, some of which had artifacts pointing to overseas links or trade. More on this later.

(B) The distribution of foreign weights between Euphrates and Indus does not always coincide with that of seals or traded items. Only at Susa and on Bahrain do both seals and weights of Mesopotamia occur. Not a single Mesopotamian cylinder seal occurs at Harappan sites.

(C) No duck-shaped weights occur at Harappan sites, but these and barrel-shaped ones are found on Bahrain.

For long it has been said that after 2,000 BC Mesopotamia's trading sphere shrank to direct dealings only with Dilmunite middlemen in the upper Gulf. For in the Larsa-period archive from Ur are references to trips to Dilmun but not Magan, and to Dilmunites paying tithes at Ur ; at Susa a Dilmunite is a commercial partner ; and the maximum number of Gulf seals are post-2,000 BC. However, barrel-shaped weights begin in Mesopotamia with an inscribed weight of Shu-Sin of Ur (2,040-2,029 BC) and so Mesopotamian traders were present in Harappan towns around/after

2,000 BC³² (Mackay³³ found that no barrel weights occurred in the lower strata of Mohenjo-daro). Two Dilmun seals from unstratified contexts in Gujarat, incidentally, are also of this period. Do these finds signify changes in trade patterns around the turn of the millennium ? Perhaps. Dilmun had come into its own with the urbanization of Qala'at al Bahrain in the Ur III period ; there appear to be no Harappan artifacts in the upper Gulf after *ca* 2,000 BC ; and Anatolian silver entered the south Mesopotamian exchange circuits from *ca* 1,940 BC.

32. Duck and elliptical shaped weights do in fact occur together : in an early second-millennium sarcophagus burial at Susa was a pebble weight, a small duck and 5 barrel, or bullet-shaped weights (together with a pair of weighing scales) TALLON, 1987 ; at Saar tumulus 4 in Bahrain, *BCTS*, both kinds occurred ; at second-millennium Ur, I.G 153 was a burial with 3 ducks and 6 elliptical weights, WOOLLEY and MALLOWAN, 1976. In the Shamash-temple cache at Larsa there are 25 ducks and 38 ellipsoid weights, ARNAUD *et al.*, 1979. And in the Assyrian residential precinct at Kanesh-Kultepe too, both forms occur, ÖZGÜÇ, 1986. This means that duck weights continued to be used in the second millennium. Yet, as far as we know, the barrel ones do not pre-date *ca* 2,040 BC.

33. MACKAY, 1938 : 403.

(D) The range of exotic items at different bronze-age sites is not matched by the number of exotic weights, which are few. The archaeological record is not a mirror of ancient life : at Kultepe, for instance, despite abundant written testimony of tin imports from Assyria, miserable quantities of tin (say, a single find of 3 tin ingots, the largest weighing 50 g³⁴) have been excavated. Again, several references in the Mari tablets to weights and weighing contrast with less than 20 excavated weights and not a single one of the heavy lead weights mentioned in the texts³⁵.

Weights occur singly or in sets. When a Mari official weighs out 3.5 kg of silver for manufacture, he uses weights of 5, 1, 1/2, and 1/3 *mana* together³⁶. Little would be served by a single weight. But of the seven sites in table 1 (including Qala'at al Bahrain although it used the Dilmun system), four had single Harappan weights. It is in the Bahrain burials alone that entire sets of foreign (Mesopotamian, not Indus) weights have occurred. Burials in any case indicate a post-usage context³⁷.

Local weight sets have been found in burials in early second-millennium Ur, burials that were otherwise sparsely furnished. In dwelling areas such as the craft suburb of Diqdiqqeh they were found as singles or strays³⁸. A large number of single Harappan weights occur at Mohenjo-daro, about six in the DK-G area, eleven in HR, and three in VS, and one wonders what utility a single small weight would have had.

Weights, however, do occur as sets in Mohenjo-daro as indicated above, and at Harappa nine local weights come from one trench in Mound F, ranging between 3.35 g and 25.35 g, three of these being about 13.7 g.

At level IIa, Qal'at al Bahrain³⁹, near the city gate that leads out to the sea, was a small square with a well (its coping was rectangular) and an oval water trough for the animals that carried loads to and from the boats that were anchored far away (the sea here is exceptionally shallow). Four flattened-sphere weights lay in rooms to the west of the square, two cubical ones on the east. A round Gulf seal with Harappan writing occurred a short way south. This is a rare and illuminating occurrence of weights found in a place where they were probably actually in use.

(E) The weights in tables 1 and 2 are small. Not one is even 1/4 kg in value. A common inference is that this signifies trade in high-value items, and written evidence does refer to two shekels (16 g) of lapis lazuli, or 1/6 shekel of gold⁴⁰. But the texts also record that 85 or 100 kg copper was shipped in ED III times from Dilmun to Lagash, 240 kg of wool to Dilmun or 2,182 kg to Magan in Ur III times – or that 20 *mana* (10 kg) silver went overland to Mari⁴¹ – far “out of sync” with the numbers and sizes of weights found.

Let us, then, turn to the sizes of weights in the home countries.

In the intramural graves of OB Ur, the heaviest in a full set of 17 with a scale pan weighs 25.60 g⁴². In the Shamash temple hoard of jewellers' material and equipment, the largest weight is less than 200 g⁴³. But there are far heavier known weights in Sumer, as mentioned above.

We expect a seal owner to have owned one or perhaps two seals in his lifetime, but traders would need entire weight sets. Even so, only 330 weights were identified at Mohenjo-daro, as against about 1,262 seals. As Bisht⁴⁴ found at Banawali a cubical weight so small that it is difficult to pick up with one's fingers, it is not recovery that is at issue here.

Let us now consider size frequencies.

To judge whether the scarcity of large Harappan weights is to be expected⁴⁵, we go to table 4.

We find substantial numbers of large weights in rural and urban use.

Second, we would expect heavy weights of the 60 + kg sort guaranteed by Ur Ningirsu to be left behind where they were being used. Thus the archaeological record (table 3) contains the reverse of what we expect. Why are large weights relatively few at our sites ? Either they have escaped identification, or else bulk items were quantified by capacity, or else there were alternatives. As regards identification, at Mohenjo-

34. ÖZGÜÇ, 1986.

35. JOANNES, 1989.

36. DURAND, 1983.

37. In contrast to Sumer and Bahrain. Harappan graves contain no weights.

38. Ten elliptical haematite weights (WA117891-900) of graded sizes (1 *mana* – 3 shekels or 25 g) on display in the British Museum come from a private collection (Julian Reade, pers. comm.) and may not constitute a closed find.

39. HOJLUND and ANDERSEN, 1994.

40. LEE MANS, 1960.

41. ALSTER, 1983 ; LIMET, 1985.

42. PEYRONEL, 2000.

43. In the huge hoard of stones, beads and 67 weights in the OB Shamash temple at Larsa, weights were clearly associated with lapidary work and work in silver and gold, and so the absence of large weights is not surprising. ARNAUD *et al.*, 1979, however, also point out that weighing scale pans may have been fragile ; that small weights give maximum accuracy ; and one could always use several weights together.

44. Bisht, pers. comm.

45. In contrast at early historic Taxila weights heavier than 5 kg are more in number than those weighing less than 500 g.

Table 3 : *Size distribution of Harappan weights.*

Weights tabulated	Largest**	Smallest*	Number of weights around 13.7 g	Number of weights of 27 g approx.	Number of weights less than 100 g	Number of weights more than 500 g
Mohenjo-daro : 330	11.4 kg	0.87 g	91		304	11
Harappa : 199	2.65 kg	1.3 g		51		3

* A weight at Banawali is 0.214 g. Smallest known Sumerian weight – duck-shaped – (POWELL, 1999 : 16) : 0.2923 g.

** Largest known weight in Sumer : 60.5 kg (Ur Ningirsu).

Table 4 : *Weights in use in towns, mandis and villages in the Punjab, 1928-1931.*

	Number of stamped wts	Number of <i>kaccha</i> wts (unworked stone/brick/wood)	
		in villages	Total
1 maund (= 40 seers)	115	1	116
20 seer	262	1	263
10 seer	122	119	241
5 seer	850	166	1,016
2 seer	1,722	93	1,815
1 seer (approx. 1 kg)	1,688	165	1,853
1/2 seer	1,906	120	2,026
1/4 seer	1,823	118	1,941
1 chatak (1/16 seer)	1,367		
1/4 chatak (1/64 seer)	39		

(Source : MYLES, 1936. Fewer small weights in wholesale markets ; fewer large weights in villages. Smallest weights considered in this survey : 1/4 chatak).

daro and Chanhu-daro ordinary pebbles were used as small weights (4.1 to 37.18 g)⁴⁶. Two terracotta cubes are reported from Lothal, and one from Mohenjo-daro is on display in the National Museum. For all we know, some terracotta and stone objects of spherical and pyramidal shapes from Early Indus and Harappan sites were weights⁴⁷. Højlund and Andersen suspect a pointed oval chalcedony piece found in a disturbed stratum at Qala'at al Bahrain to have been a weight. Judging from a set of these from Bahrain in my possession, this is probably a pearl diver's weight. Large weights would have been unpolished, less visually striking, less accurate, and hence harder to identify at excavated sites.

46. MACKAY, 1938, 1943.

47. Surprisingly few weights have been identified at early historic sites in India. *Arthashastra* II.19 refers to different kinds of seeds beans being used for weighing silver and for gold, but says little about what the weights were like.

Present-day alternatives are also instructive. A poor peasant woman near Lonavala weighs out her *haldi* using another *haldi* root as the counter-weight on her scales ; so too, grass. At the Janapada Loka at Ramnagara are displayed stone weights of southern Karnataka that look like the capitals of miniature stone columns, used for vegetables, chillies, and tamarind. Four of these together weighed approximately 10 kg. A pecked sphere of basalt/limestone was used to weigh only butter. Many capacity measures are on display and it is clear that in recent centuries at least capacity measures of wood, copper, or brass, rather than weights, were in use for bulky items. The *seer* was both a capacity measure and a weight. Let us not forget, either, the recent *kavri* – a coin cum weight – and the humble *ratti*. Stone weights shaped like dragons were used in the opium trade in the colonial period. In sum, South Asian weights have been of coarse or fine-grained stones ; brass ; bronze ; seeds and iron ; and most important, different weights have been used for different items.

Little weights, with their attractive hues and sheen, and their remarkable shapes, could have been saved as curiosities after they ceased to be used as weights. Perhaps, then, the small weights in secondary contexts abroad are strays without functional significance⁴⁸. Small weights, besides, are likely to have been more accurate and more appropriate for delicately balanced scales. Thus few weights and small weights are perhaps connected phenomena in the formation of the archaeological record.

We can now ask why weights were taken abroad. Would the people of Dholavira, say, have wanted their imported wool to be weighed out for them by the Sumerian *mana* ? At any hypothetical international market place goods would surely have been quantified by the locally regulated system.

48. VOGT, 1996.

We also rule out weighing at periodic markets/fairs. At contemporary tribal markets and village *haats*⁴⁹, where, local shop keepers aside, people who come to sell are not retailers and do not produce for the market, exchange is lot for lot or a lot for a sum of money. There is no quantification by volume or weight, nor yet by number. You pick up a bundle of *datan* sticks or a length of *bhendi* string for so many rupees. No seller will tell you their weight/number : they are there for you to examine. So too in markets in Papua New Guinea, lots carried their prices and sellers did not lower prices, or enlarge bundles, if they could not sell : they took the goods back home⁵⁰. Transactions in periodic markets thus do not depend on quantification.

Besides, packed and sealed goods with which an ancient trader left the home country would already have been quantified/weighed, the need to re-weigh arising only if a lot had to be broken up. The weighing of goods abroad with one's home weights may, thus, be linked more with imports than exports. Perhaps you needed to use your own weights with reference to the return on your goods, to see exactly how much you were getting. We find in UET V 796⁵¹ that an Ur merchant had received copper in Dilmun by the Dilmun weight. Some of it was paid out according to the Dilmun standard. But when accounts of who still owed whom were rendered back home (the tablet was found at Ur), the weight was converted to the Ur standard. So weighing abroad with home weights could have had more relevance for imports because it was in the home country that a merchant was accountable. We can see why Powell⁵² looks on weights as evidence of retailing in a Market-system.

Yet accountability in the home country could equally point to state organized exchanges. There are numerous indicators of **elite organized** production, distribution, and **trade** in Harappan society. First, there is clustered settlement with Harappa and Mohenjo-daro (each 120 ha +) each ten to fifteen times the size of the average site. Craft centres such as Lothal and Chanhudaro were a maximum 10 ha, and the fortified Surkotada 2 ha within its walls. In the large cities were also imposing residential architecture, and public spaces and buildings. Besides, exotic stones, shells, the silver that came from overseas, and carved Iranian and Omani stone vessels occur mostly in the large Harappan sites. The administrative

artifacts are also significant in their distribution : tokens of steatite, faience and clay, often inscribed, occur almost exclusively at Mohenjo-daro and Harappa. Last, there is the curious feature of the storage facility at Lothal being disproportionately large as far as actual floor area of storage space is concerned : larger (at 832 square m) than the one at Mohenjo-daro (749 sq. m), a settlement more than ten times larger.

So too, in Sumer we have written testimony of royal expeditions. The ED ruler of Lagash, Ur-Nanshe, in his dedicatory inscriptions repeatedly mentions Dilmun boats bringing cargoes of wood from the mountains⁵³. A merchant brought specified amounts -- 85 kg, 100 kg, 6-7 kg -- of copper from Dilmun for the wife of Enentarzi, ruler of the same city⁵⁴. A little later, copper from Dilmun (for which barley, flour, and cedar had been exchanged), was weighed out in the palace for Lugalanda. Expeditions abroad for the procurement of wood or metal are explicitly testified in the inscriptions of Gudea, who had cedar trees cut down with large metal axes and had copper mined in a distant mountain range⁵⁵. Ur-Nammu restored the Magan shipping to its mooring place near Ur and standardized the stone weights⁵⁶. An administrative text of the period mentions a huge quantity of bitumen being used to caulk a Magan boat, together with other materials like reeds⁵⁷, and there is, on another tablet, a list of bread rations for builders of Magan-boats. Tablets from the main temple of Ur⁵⁸, meanwhile, refer to measured/weighed quantities of barley/oil/wool being handed out to merchants from the temple storehouse as merchandise for trade in Dilmun⁵⁹. And some Mari tablets mention the king's weights, and weighing in his presence⁶⁰.

Polanyi maintained⁶¹ that the import interest was the key factor in early long-distance movements of goods, and that this explains the role of the state and the hand of the administration in organizing weights, warehouses, seals, packaging, etc. Helms⁶², citing Polanyi, affirms that all trade was "originally specific", with discontinuous ventures to obtain goods. The point was not a two-way exchange even though it is nec-

49. Observed at Tejgarh, Kavath and Chota Udepur in eastern Gujarat. There is Census documentation also.

50. STRATHERN, 1992.

51. ROAF, 1982.

52. POWELL, 1999.

53. SOLLBERGER and KUPPER, 1971.

54. ALSTER, 1983.

55. EDZARD, 1997.

56. FRAYNE, 1997.

57. POTTS, 1990 ; CLEUZIOU and TOSI, 1994.

58. LEMANS, 1960.

59. EYRE, 1987 and BERLEV, 1987 on Egyptian state expeditions to the eastern desert for the quarrying of stone.

60. JOANNES, 1989.

61. POLANYI, 1975.

62. HELMS, 1993.

essary sometimes to give in order to acquire. The spatially distant sender is not an exchange partner, and Helms stresses the prestige involved in such acquisition. This approach is supported by some of the symbolism of the Enmerkar epic and starting statements that in the beginning "... transport was not engaged in... [and] the commissioning of travelling merchants was not practised"⁶³.

From state or elite-organized expeditions it is not a far step to **tribute** or the **forcible seizure** of goods. After Manishtusu defeated thirty-two settlements on the Lower Sea, he had the black stones of the region quarried and transported to Akkad⁶⁴. On Cylinder A Gudea mentions his procurement expeditions ; he also claims that "great fear of my House hovers over all the lands" – so that all came to do his bidding⁶⁵, and that the god of Dilmun was commissioned to transport copper to him as if it were grain. If Gudea exported things in order to procure copper/cedar/gold abroad, that is not mentioned – it was not the setting up of systems of exchange that was the aim. So also Shu-Sin of Ur conquered Zabshali and then set its people to mine its silver and gold⁶⁶. Seizure and tribute being part of political action, we would not be surprised if goods were quantified, weighed, or enumerated – for distribution to loyal followers, for hoarding in a treasury, for propaganda, as a pious act, or for dedication in a temple. Rimush of Akkad, after his return from the conquest of Elam and Barahse, dedicated to the deity of Nippur 30 *mana* gold, 3,600 *mana* copper, and 360 slaves⁶⁷.

We cannot, however, dismiss commerce or **retail trade**. After the Ur III period, texts from Ur reveal the quantification of transactions by weight. "Single persons" who went to trade in Dilmun paid tithes to the Ningal temple on their return. After about 1,820 BC, during the reign of Rim Sin, men going to Dilmun took specified quantities of silver, textiles or oil from others to trade for copper or "fish-eyes"⁶⁸. Earlier too, merchants abroad on the king's trade could have engaged in private transactions, but it is the distinction between import-export commerce on the one hand and state procurement of specific things (the import imperative) on the other, that is being made here.

Assyrian merchants in Cappadocia bore the risks of loss and made contracts with individual Anatolians, often lending

them silver⁶⁹. They refer in their letters to profitable exchanges of gold and silver for tin and textiles at Assur. Tin and textiles were exchanged for copper and miscellaneous Anatolian products, and only ultimately for gold and silver. Tablets contain accounts of the expenses of transportation and the tolls exacted at halts en route⁷⁰.

Moreover, texts refer to the use of silver as a medium of exchange⁷¹ and the Ur-III balanced accounts of Umma give itemized statements in two columns of outgoings and inflows, with their silver values. There are even second-millennium omens about conditions favorable for profit. Also, texts of the early second millennium mention silver fetching so much copper, or the silver rates for two different qualities of wool.

Silver was a unit of account, and the Ur III texts refer to the use of silver rings for administrative purposes. A princess of Ebla was given 22 pairs of silver earrings, weighing either 78 or 39 g each and Archi⁷² suggests that so many pairs of standard weight mean that this was a store of wealth for the princess who was about to take up a priestly office. In Sumer, a text may refer to the making of 240 rings weighing 5 shekels each (In Akkadian period levels at Tell Taya were silver coils that could well have been such "rings"). In the Ur III period coils were disbursed by rulers to officers returning from official journeys : was this reward a kind of precursor to trade profits ?

Any linkage of the sort "weights mean retailing and the Market system" can, however, be questioned. First, exchange, whether retailing or gift, constitutes only a part of the economy, and cannot be fully comprehended without reference to production and distribution. Polanyi's "redistribution" is an aspect of distribution, the allocation of produce according to social laws. His "reciprocity" falls in the rubric of exchange (including retailing), accruing as it does from an individual's dealings with his own share. So no economy is reducible to reciprocity, redistribution and exchange, much less to retailing in the market place.

Mesopotamian production and distribution were based on communal land tenure and production in the countryside, together with the labour of the populace on the lands/herds/fisheries/craft workshops of the temple/ruler. Except for the *kudur-rus* there is little third-millennium evidence for individual ownership, which in any case is not tantamount to land function-

63. COHEN, 1973.

64. SOLLBERGER and KUPPER, 1971.

65. EDZARD, 1997.

66. FRAYNE, 1997.

67. SOLLBERGER and KUPPER, 1971.

68. *Ibid.*

69. VEENHOF, 1972.

70. *Ibid.*

71. VEENHOF, 1972 ; POWELL, 1999 ; MICHEL, 1998.

72. ARCHI, 1987b.

ing as commodity or as capital⁷³. Aware as we are of the difficulties of deriving an economic structure from the testimony of individual texts or archives, we would insist that bronze-age economies are not underdeveloped versions of our own and that it is in the framework of third-millennium realities that we need to consider the appropriateness or otherwise of retail trade.

The use of silver, individual profit, and shifting exchange ratios do not total up to a demand-supply price-regulating economy. Neumann⁷⁴ shows that the Ur-III balanced accounts list what the state made available, and what was realized by the merchant from it – not what we understand as credit and debit. It was in order to compare entries that values were given in silver. In any case, those who wrote the Umma balanced accounts were merchants responsible to the state, not private entrepreneurs, Snell⁷⁵ says. As far back as 1950 Leemans had shown that in the time of Rim Sin of Larsa, too, in balanced accounts the starting entry was clearly specified as so much silver “that came from the palace”.

In feudal Europe the sale and purchase of land existed but did not regulate its use. Lords did not view their lands as capital from which to derive profits. Landed property was instead the basis of social status⁷⁶. Most important, as Polanyi said, market-places and retailing or barter have been ubiquitous in history and lack structural significance. Not having a feedback into the subsistence sphere, they do not bring about a commodification of land or labour. In market-places only a fraction of agricultural produce may be marketed, and market-place exchange can co-exist with gift giving and lineage interaction and also with the urban-industrial sector of modern times. Often the seeds of the Market-system have lain not in the expansion of market-place exchange, but in colonial policies that engendered wage labour or encouraged agricultural production for the market.

Price formation in Anatolia in response to the supply of tin from Assur, a thousand-km and six-week journey away, is often cited as an argument for Market economies. Whereas a shekel of silver got you 6 to 7 shekels tin in Kanesh, in Assur the ratio was 1 : 14 or 15, so that Assyrian merchants made sizeable profits. In a true Market-system production and distribution would be controlled by the price mechanism. But in

the bronze age a metallurgist in Anatolia who found the price of Assyrian tin high would not easily find a substitute elsewhere, or use lead instead, as an alloy. Tin was an essential component of bronze, the material of most tools and weapons. A fall in its price would not have made metallurgists alloy more than, say, 10 per cent ; neither would it have prompted them to make new types of tools/weapons of bronze. In fact, weaponry would have to be cast on a substantial scale in times of war, and the use of metal then would be a factor of political vicissitudes, making demand independent of “price”. So too, supply. It is highly unlikely that those who mined the tin (in Central Asia, Iran or Afghanistan) ever knew the final destination of their product ; it is even less likely that they received silver for it ; so a rise in the price of tin in Kanesh would not have prompted increased extraction.

Thus the use of weights points to some amount of retailing, but is not by itself evidence of the Market-system. Making a profit by selling something at a higher price than what you bought it for is not the same thing at all as production for profit in the market.

The occurrence of weights abroad would appear anachronistic considering that things like carved steatite containers, long carnelian beads, etched beads, and shankhs moved cross-culturally. Not the sort of things to be casually discarded or actually consumed, these would have been passed down the generations as heirlooms or else were deposited in graves (at Hili, Shahdad, Ur, etc.), hoards (Mohenjo-daro and Harappa), or temples (Mesopotamia, Susa). Such items cannot have been commodities pure and simple but could have been exchanged as gifts of **cultural value**.

Cultural value is certainly affected by supply, but scarcity is not a source/cause of that value⁷⁷. The distribution of carved chlorite containers between the Euphrates and the Indus shows that across the world, their mythological or cultic significance was understood, the raw material valued, and craftsmanship appreciated. Paradoxically, while many chlorite containers occur in graves there is also evidence of their seizure as war booty by the rulers of Akkad. And whereas in commodity exchange value hinges on an external criterion such as money, cultural value can vary. For instance, a terracotta statuette in a tomb at Shahdad is strikingly similar to Early Dynastic sculpture in the Diyala, but in Mesopotamia such statues were placed in temples to remind the deity of his devotee, not in graves⁷⁸.

73. Lamberg-Karlovsky says that communally held land could have been regarded by its owners as “their private property” – but private property involves rights of disposal, whereas joint tenure in the tribal system gives no such right, no right to dispossess a member, or to use water to the detriment of one’s neighbour.

74. NEUMANN, 1999.

75. SNELL, 1982.

76. POLANYI, 1946.

77. FRIEDEL, 1993.

78. AMIET, 1986.

By gift exchange we mean, here, *not* Sahlins' generalized and balanced reciprocity within a social group, but cross-cultural ceremonial gifts amongst elites, between distant partners unknown to each other. Such gifts would be less loaded with moral value or social obligation than with political declaration – a more powerful king bestowing far more lavish gifts than a junior or, in reverse, a subjugated kingdom required to send “gifts” of high value to its conqueror. In the late Bronze-Age royal correspondence of Amarna a ruler writes to a peer complaining about the value of a gift (in gold) from his “brother”. The ruler of Cyprus writes that his people protested when the Pharaoh had timber taken away and the “price” was not paid⁷⁹. But what were these values and “prices”?

Certainly they could not be purely fictitious valuations of goods. Gifts and commerce overlap. Akkadian *sūbultum* can mean “gift” in certain contexts, but a commercial consignment in others⁸⁰. The phrase *biltu u tamartu* meant “tribute and gifts”⁸¹. While an important tin trade route went past Mari, we also know that (*ca* 1,771 BC) on a royal tour Zimri-Lim made gifts of tin to the kings of Alep, Hazor and Ugarit, carrying with him some 450 kg of it, all told⁸². We are reminded yet again of the political factor. Like tribute, royal gifts could be weighed. Texts from Mari that list royal gifts (tin or lapis stones) often state the weight⁸³. When silver and gold cups were sent, presumably as gifts, to other cities from Mari, these too were weighed⁸⁴.

Meillassoux shows that in traditional societies, the prestation of staple goods by juniors to elders, the exchange of marriage gifts, and gifts between elites “never enable the products to be confronted with one another”. Gifts exchanged by bride takers and bride givers do not amount to a literal exchange. Value remains abstract, and cannot be measured physically in terms of other objects. The amount of bridewealth given is not a measure of the value of the bride or her people (So too, gifts made to a kinsman after he has helped in work are not a literal measure of the amount of labour). And since gifts are made at separate points of time, “the objects cannot be measured in terms of each other. *No exchange value can emerge under these conditions*” (emphasis added)⁸⁵. For her part Humphrey⁸⁶ discusses exchange situations in which it is obligation

and “mutual payments” rather than “equal exchange” that are relevant. Might not a similar principle guide our interpretation of ancient gift giving between kings?

We come to the realization that things could have been weighed in order to measure worth and not market price. Perhaps that is why Rimush weighed the (gold and copper) spoils of war that he dedicated to his deity. The publicly measured weight is connected with the receiving party estimating its value.

The institution of *xenia* in ancient Greece, where a man traded on another island with his Host-Friend, and its analogues in the Tibet-Nepal trade⁸⁷ and pre-colonial Melanesia (where women of one community made pots for trade on other islands, but always in the same places and with permanent trade partners there – exchange ratios would have been standard⁸⁸) are of great significance. True, the sea voyage between Mesopotamia and South Asia was not so easy or so short that we can expect people to have visited one another so often/regularly as to form personal partnerships as did the island-hopping Greeks. But considering the contexts in which some Mesopotamian weights occur in Mohenjo-daro, this is a distinct possibility.

We have seen that Mesopotamian traders appear to have visited Harappans in their homes or residence-cum-craft compounds, and this could well signify relationships of mutual trust and honour. True, regularly trading ritual friends use the weights and measures of the host culture⁸⁹. Although local weights were not reported in block 12, DK-C⁹⁰ or in XII.2.VS-A⁹¹, in the other houses mentioned above not just barrel weights but also local weights were found. Significantly, some of these do seem to be houses of the elite.

In her analysis of *xenia*-type barter between Nepal and Tibet, Humphrey⁹² found Indian rupees to be less money than objects of barter used as treasure or for making jewellery – a remarkable parallel to the role of silver in the Bronze Age. Exchange ratios did not reflect supply and demand. Although people were aware of the comparative valuations of many things, the goods had no *a priori* or standard ratio based on an external criterion like silver. Instead, valuations varied. Although each trading group

79. LIVERANI, 1990.

80. LEEMANS, 1960.

81. CAD.

82. JOANNES, 1991.

83. LIMET, 1986.

84. SNELL, 1995 finds that this verges on the use of the cups as a special-purpose money. The weight of the metal was less than the value of the cup.

85. MEILASSOUX, 1978 : 143-146.

86. HUMPHREY, 1992.

87. FUERER-HAIMENDORF, 1975 : HUMPHREY, 1992.

88. BELSHAW, 1965.

89. HUMPHREY, 1992.

90. The entire block house has not, however, been uncovered.

91. For this no complete list of finds is available.

92. HUMPHREY, 1992. SNELL, 1995 reports scant references to barter in ancient western Asiatic tablets. In fact, if something was acquired in return for grain, was that barter, or was it an instance of grain functioning as currency?

used its own weights and measures, these were not standardized. The point was not an actual rate of quantified exchange, but a means of conceptualizing a fair deal. It was trust that sustained the exchanges.

In the state correspondence of Ugarit in the late Bronze Age Snodgrass⁹³ found that many gifts between rulers were quantified by number, weight or even silver "price". True, no one would arrive at an equivalent of 30 shekels silver and a bronze vessel for a fine horse, without a realistic estimate of prevalent exchange ratios⁹⁴. But this does not constitute commerce. The "price" is not a true price in our sense, because it has not been mutually agreed as an equivalence; partners desired the maximum counter-gift feasible. The rates of exchange, therefore, were not pre-existing valuations. The point was mutual obligation rather than equal exchange.

There is nothing self-evident about the testimony of the weights, and I have suggested multiple ways of looking at the material. Small weights abroad do not necessarily signify high-value exchanges at the site of discovery, as many could have been strays, large weights missed by us, and small ones more appropriate for delicately balanced scales. But Mesopotamian weights in the well-appointed Mohenjo-daro houses may well speak of exchange between "Friends". Other movements of goods that also involved weighing were politically inscribed. Thus weights do not signify only the measurement of commodity value – and in any case commodity exchange is not by itself tantamount to a Market-system as we know it. Worth is not the same thing as price.

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93. SNODGRASS, 1991.
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